DIELECTRIC PROPERTIES OF $La_{2-X}Sr_XNiO_4$ AND $La_{2-X}Sr_XNi_YCu_YO_4$ CERAMIC MATERIALS

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The main trend in development of microelectronics is miniaturization and increase performance of various devices. Systems $La_{2-x}Sr_xNiO_4$ are promising for the electrochemical structural elements and microelectronics technology, for example, as a dielectric in capacitors due to the presence of giant permittivity and its weak dependence of temperature and applied electric field frequency [1,2].

The purpose of this study is to identify the impact of external factors (concentration, temperature, pressure, frequency of electric field) on the electrical properties of materials $La_{2-x}Sr_xNiO_4$ and $La_{2-x}Sr_xNi_yCu_yO_4$ (x = 0.125, y = 0; x = 0.2, y = 0.2), synthesized by sol-gel method; establishing the presence of high dielectric constant. Thermobaric treatment was used for $La_{1.875}Sr_{0.125}NiO_4$ (termobar.) and $La_{1.8}Sr_{0.2}Ni_{0.8}Cu_{0.2}O_4$ (termobar.) samples at dc and ac electric field.

The complex oxide phase $La_{2-x}Sr_xNiO_4$ and its solid solutions belong to the K_2NiF_4 type structure (Fig.1). In $La_{2-x}Sr_xNiO_4$ crystal structure of the conductive octahedra NiO_6 layer, alternating with an insulating coordination polyhedra AO_9 layer. Some publications link K_2NiF_4-type structure with effect of a giant permittivity and report that distorted coordination polyhedra and compression along the c-axis contribute in the appearance of a giant permittivity.

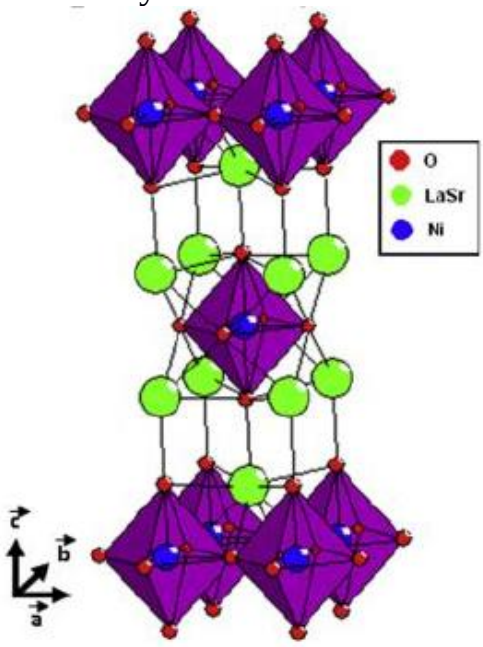

Fig. 1. Tetragonal K_2NiF_4 type structure [3]

The study of samples obtained at the various temperature and pressure conditions can make a great contribution to investigating the influence of the morphological characteristics to the nature of the effect of a giant permittivity oxides based on nickelate K_2NiF_4 type structure [4].
Analysis of the connection between the structural parameters of materials with their dielectric properties showed that the dielectric constant increases with deviations from the ideal structure.

Research supported by grants from RFBR No14-03-00103 and No16-02-00857.

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КОМПЛЕКСООБРАЗОВАНИЕ ИОНОВ ЕВРОПИЯ (III) В РАСПЛАВЛЕННЫХ ФТОРИДАХ ЩЕЛОЧНЫХ МЕТАЛЛОВ

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Eu (III) ION COMPLEXATION IN MOLTEN ALKALI FLUORIDE SOLUTIONS

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Sperctral research of molten EuF_3-MF (M=Li, Na, K, Cs) was performed. The samples were prerepared using zone molten alkali fluorides. Absorption spectra were mesured using samples with the same amount of EuF_3. The behavior of hypersensitive and common f-f transition bands was described. Absorbtion bands correspond to f-f transitions in EuF_6^{3-} groups. The composition of EuF_6^{3-} group second coordination sphere depends on solvent alcali cation type.

На спектрально аналитическом комплексе производства СОЛ-инструментс, г. Минск, были получены электронные спектры поглощения расплавленных систем EuF_3-MF, где M=Li,Na,K,Cs. Методика измерений описана в работе [1]. Основным состоянием ионов европия (III) является $^7F_0$. Полученные максимумы полос поглощения высокотемпературных спектров были подвергнуты разложению на гауссовские компоненты, результаты сведены в таблицу. Как видно из таблицы в электронных спектрах выделяется «гиперчувствительный» переход $^7F_0 \rightarrow {}^5D_2$, и «обычные» электронные f-f переходы.

Относительная интенсивность полосы поглощения «гиперчувствительного» перехода $^7F_0 \rightarrow {}^5D_2$ в расплавах LiF→NaF и KF→CsF уменьшается, при этом